



Usability Testing Micro-Credential

Syllabus

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General Information

STUDY TIME – 150 MINS.

KEYWORDS

accessibility, personas, usability, user experience, user interface,
Web Content Accessibility Guidelines (WCAG)

LEARNING OBJECTIVES FOR USABILITY TESTING

Introduction

(K2) Explain the difference between efficiency, effectiveness and satisfaction in usability testing

Focusing the Usability Testing

(K1) Recall sources for determining the needs and expectations of the users

(K2) Explain why depth or breadth testing would be used

Usability Test Participants

(K1) Recall the roles of professional testers and end-users in usability testing

Usability Test Planning and Design

(K1) Recall the use of personas in usability testing

(K1) Recall the purpose of user experience evaluation

Scheduling and Conducting the Tests

(K2) Explain when usability testing should occur in the SDLC

(K2) Describe how usability tests are conducted

(K2) Explain how results are gathered from usability tests

Standards

(K1) Recall standards that support usability testing

(K1) Recall the components of the usability software quality characteristic

Accessibility

(K1) Recall the meaning and purpose of accessibility testing

(K2) Summarize the common references and standards for accessibility testing

Introduction

Usability and accessibility of software are important quality characteristics and may determine whether or not the software is successful. Usability testing is conducted to evaluate how well a system can be used by the target users to accomplish a specified goal. Accessibility testing, which is considered a subset of usability testing, is conducted to ensure that users of all abilities can successfully use the product.

Efficiency (how much effort is required to accomplish a goal?), effectiveness (is the desired result achieved?) and user satisfaction (is the user “happy” with the software?) are factors that are often considered during usability testing. In addition, proper accessibility testing may be required as part of the overall testing project if accessible software is mandated by law. The results of both types of testing can then be used to improve the design to better meet the needs of the users.

The timing and scope of usability and accessibility testing can vary widely from project to project and, depending on the areas of a product targeted for evaluation, may be difficult to schedule and fit into the project lifecycle. Because of this, it is important to understand the goals of the tests before starting, consider when the testing should occur, and verify that there is adequate time in the schedule to plan the tests, review the results, and consider what changes should be made to the product.

Focusing the Usability Testing

In order to conduct effective usability testing, the tester must understand the needs and expectations of the users. This may include gaining an understanding of the product itself, as well as the day-to-day activities of the users. This information may be gathered from the following sources:

- Process maps
- Business cases
- Use cases
- Interviews
- Observation
- User guides and documentation
- Expert users or domain experts

Usability testing should concentrate on areas of the software that will be most frequently used and are most important to the user. If there is an existing product to use for comparison, complex

user interfaces and existing features with a history of a high number of technical support issues should also be evaluated, to avoid perpetuating any problems.

Prioritization is important because the scope of usability testing is often limited by project schedule and budget. For new software, where usage is anticipated but not known, sampling may be done to allow testing across the overall User Interface (UI).

This type of testing will provide information regarding the expected user experience and can serve as a breadth-based test. For areas where extensive usage is expected, depth-based testing is appropriate. By approaching the testing with a calculated combination of breadth and depth testing, the best coverage can be obtained in the shortest period of time.

Usability Test Participants

In larger organizations, usability is a specialized discipline that leverages usability experts with training in psychology and design. Ideally, these experts also have some knowledge of software development and at least some exposure to testing. When professional testers conduct usability testing, they often work closely with usability experts to design tests and check for standard usability characteristics (e.g., navigation, number of mouse clicks to accomplish a task, or screen layouts). This type of controlled testing should be augmented with testing by real (or potential) users because users know what they expect the software to do, what they need it to do and how they expect it to work.

For a given project, the usability testers should represent the skill levels and knowledge of the actual users. If there will be Subject Matter Experts (SMEs) using the software, they will have a different approach than a novice user. Both of these user types should be considered during usability testing.

While both types of testing are important, the feedback from real users is sometimes given more credence than feedback from professional testers, since the users often have actual experience with the product. This is particularly true when an observation is subjective (e.g., “the layout is confusing”).

Usability Test Planning and Design

Test planning is recommended for usability testing, in order to define the test approach, identify the goals, and to gain agreement among different stakeholders regarding the scope and expectations. With formal usability testing, guidelines for observer behavior are usually described in the test plan. Observers may be expected to not interfere, to provide help only when requested or to step in when the user appears to be getting frustrated.

As part of usability testing, users are often categorized into personas. A persona is a representation of a type of user and is often given specific characteristics (such as age, gender, profession, etc.). These personas are used during

usability design to help ensure that the needs and desires of all targeted user sets are met. During testing, the activities and reactions of real people can be evaluated against the personas that were used during design.

Another aspect of usability testing is user experience (UX) evaluation, which should also occur as early as possible. User experience refers to a person's perceptions of and responses to the software before, during and after usage. For example, happy anticipation of the use of the software is a UX characteristic. Brand image and presentation of the software contribute to user satisfaction. Like usability, the user experience must be designed into the software in order to be achieved in a cost- effective manner.

Scheduling and Conducting the Tests

Early and Continuous Testing

As with all forms of testing, it is less expensive to correct usability issues when they are uncovered early in the SDLC. Early testing is often conducted as the software is being designed (sometimes called formative testing as the software is being “formed”). This allows users and specialists to review the design before it is coded. It may be done with written descriptions, wireframes (low fidelity) or prototypes (high fidelity).

Ideally, usability testing is a continuous activity, performed frequently during software design and development. This will provide timely feedback and will help influence the design as the project progresses. In an Agile methodology, the product owner normally assists with usability testing during iteration testing to ensure that the product meets expectations.

Conducting the Usability Test

Formal usability tests are typically conducted in a usability lab, which may be equipped with video and audio recording devices, two-way mirrors and a separate seating area for observers. A formal lab may have software installed which tracks eye movements of the subjects and records the interactions of the subject with the product. Less formal testing may be conducted in an office setting or even a test lab environment. Ideally, the tests are conducted in an environment that closely mimics the user’s work environment. This will provide a more realistic experience (e.g., lighting, noise, and distractions) and will help the user to better evaluate the software.

Usability tests are sometimes conducted by having the subjects perform tasks that have been designed in advance by a usability tester. Testing may also be conducted by assigning general tasks to the users and having them figure out

how to accomplish those tasks on their own. User manuals and process documents may be used as guidelines for testing and the testing is sometimes used to review the correctness of the documents.

During usability tests, subjects generally are asked to vocalize what they are thinking while they are working through their tasks (i.e., think out loud), express any confusion that they may have and talk about what they are doing. If observers are present in the room during the usability tests and are required to be silent and passive, they can give no help or feedback to the participants. This is an important consideration as it is sometimes difficult for the observers to avoid influencing the tests.

Gathering Results

Feedback from the tests are usually gathered in two ways: defect reports and questionnaires/surveys.

Where usability or user interface defects are identified, the normal defect lifecycle should be followed, with particular attention paid to maintaining consistency. For example, if users object to the way a button is displayed, all buttons should be reviewed to determine if broader changes are needed.

Questionnaires and surveys are used to gather feedback regarding the effectiveness and efficiency of the software and the user's satisfaction with their experience. These surveys may also extend into the UX areas (e.g., emotions, perceptions, preferences, image).

Standards

There are several international standards that deal with usability. The following are commonly used:

ISO 9241-210 discusses human-centered design. This is based on understanding the expected use, specifying requirements, producing solutions, evaluating the solutions and eventually designing the best solution to meet the usability requirements.

ISO 25010 describes the software quality characteristic called usability.

This breaks usability into a set of characteristics as follows:

- Appropriateness recognition – Can the user determine if the software is appropriate for their needs?
- Learnability – Can the user figure out how to accomplish a task and are they able to apply that knowledge the next time they want to accomplish the same or a similar task?
- Operability – Is the software easy for the user to operate and control?
- User error protection – Does the software help prevent the user from making errors?
- User interface aesthetics – How pleasing or attractive is the software to the user?
- Accessibility – Can the software be used by people with a wide range of capabilities?

These two standards help to guide usability design, as well as usability testing.



Accessibility

Accessibility testing is considered a subset of usability testing. Accessibility is the degree to which a component or system can be used by people with the widest range of characteristics and capabilities to achieve a specific goal in a specified context of use. While sometimes targeted at specific disabilities, such as color blindness or hearing impairment, accessibility has generally become a broadened concept to ensure that software works for everyone, with or without disabilities.

Accessibility compliance requirements may drive accessibility testing goals and methods. It is important to clearly identify any pertinent legislation or regulations that apply, such as the ADA (Americans with Disabilities Act) and Section

508, before planning the testing, as specific goals may be defined in the regulations. Section 508 Compliance Testing, an amendment to the United States Workforce Rehabilitation Act of 1973, is a federal law mandating that all electronic and information technology developed, procured, maintained, or used by the federal government be accessible to people with disabilities.

An internationally used reference for accessibility testing is the Web Content Accessibility Guidelines (WCAG). These are widely used guidelines that were published by the Web Accessibility Initiative (WAI) or the World Wide Web Consortium (W3C). There are three conformance levels defined in WCAG: A, AA, and AAA, with AAA being the most difficult to achieve [WCAG].

Accessibility testing tools are available and can be used to quickly scan code to identify compliance issues. These tools will look for such items as text descriptions for all graphic items, usage of colors and font sizing. The tools are frequently updated and provide coverage for different accessibility areas. Research is needed to find the best tool

for a particular situation. Accessibility tends to be a specific area of testing expertise because it requires a deep understanding of the regulatory requirements and the tools that will determine conformance to the standards.



References

ISO/IEC/IEEE Standards

- ISO/IEC/IEEE 12207:2017
- ISO/IEC/IEEE 15288

Trademarks

The following registered trademarks and service marks are used in this document:

- AT*SQA® is a registered trademark of the Association for Testing and Software Quality Assurance

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